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ABSTRACT

This paper assesses the relative merits of numerical and textual approaches to the study of international events. While enjoying a much longer history, numerical approaches have certain representational drawbacks that do not apply to textual approaches. Textual models provide a more adequate descriptive foundation for the study of international events. The paper argues that attention should be devoted to the development of hypothesis-testing techniques for the analysis of international events and suggests the form those test might take. The paper calls for efforts to apply existing textual analytic methods to international events' analysis and for efforts that would attract computational linguists to this application area. A 57-item bibliography is included. (Author/JHP)

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Theory and Text:

How Textual Analysis Can Help Build International Relations Theory

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Theory and Text:

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Abstract

This paper assesses the relative merits of numerical and textual approaches to the study of international events. While enjoying a much longer history, numerical approaches have certain representational drawbacks that do not apply to textual approaches. In particular, it is argued that textual models provide a more adequate descriptive foundation for the study of international events. The paper argues that attention should be devoted to the development of hypothesis-testing techniques for the analysis of international events, and suggests the form those tests might take. The paper calls for efforts to apply existing textual analytic methods to international events analysis and for efforts that would attract computational linguists to this application area.

1. Introduction

When inviting me to speak today, Phil Schrodt asked me to address a set of questions concerning text analysis. Why, he asked, should students of international relations and foreign policy collect and analyze texts? How might qualitative computational textual analysis differ from or improve upon quantitative computational numerical and statistical analysis? In short, how can textual-analytic techniques help build IR theory, as five distinguished scholars suggested at these meetings two years ago (Caporaso, et al., 1986)?

John Mallery and I have spent the past several years implementing Relatus -- a computational environment for textual analysis (Duffy and Mallery, 1986) -- so it behooves us to provide answers to this sort of question. I will endeavor to do so here.

I intend to engage in no "wrecking operation" (Hoffman, 1959; Bull, 1969). Much has been and remains to be gained from quantitative studies of political phenomena. It would be irresponsible to suggest that we forget this legacy and embark exclusively in a new direction. I adopt Robert North's (1969) stance in the old methodological debate between traditionalists and behavioralists -- the stance of methodological pluralism.

Traditionalist historians see themselves as detectives. They scour textual archives for evidence to warrant hypotheses about the motives of political actors and the causes of political events. They produce stories that reconstruct the contextual

details of actuality in richly descriptive terms. At their best, these stories can animate vivid portraits of political events and processes in the minds of readers.

The behavioral critique of traditionalism, however, cautions that these results are *idiographic*. They are one person's subjective account of political affairs. There is no guarantee, so the critique often goes, that my archival detective work will reproduce your archival detective work. Even if reproduction were possible, the critique continues, richly descriptive accounts of particular slices of the time-space of history do not necessarily sum to general, or *nomothetic* knowledge. The behavioralist insists upon applying replicable operations using data that are representative of the universe of particular instantiations of the general constructs under study. The behavioralist wants to develop general, nomothetic laws concerning the causal relations that mediate these constructs.[1]

It's important to recognize the knowledge interests (Habermas, 1968) that stand behind these approaches to social science. While both seek to explain and perhaps predict political events, the knowledge interests of nomothetic and idiographic approaches differ with respect to their practical, extra-scientific goals. Nomothetic knowledge interests incorporate *control* as a goal, while idiographic knowledge interests incorporate *freedom* as a goal.

The nomothetic interest in control is perhaps an unconscious by-product of the fact that their techniques have been borrowed from natural scientists, for whom the control of nature has always been a paramount goal (Leiss, 1972). The idiographic interest in freedom, on the other hand, finds expression in particularistic understandings of political phenomena. These particularistic studies, conducted without any expectation of universality, express the human ability to interpret reality as one sees fit -- to redefine in creative ways situations that "scientism" attempts to force into one or another universal cubby-hole. The uniqueness of human action in particular contexts thus expresses human freedom from control.

Laudable though the knowledge interest in freedom might be, an embarrassing trade-off results. The romantic idiographic concern to couch explanations in terms that express human freedom delimits the enlightenment concern for the construction of predictions with which we can construct a more rational and humane world. If human events can only be understood particularistically, without reference to universal constructs, we cannot deploy *modus ponens* to predict.

With respect to nomothetic versus idiographic approches then, I, like Billy Martin in the beer advertisement, feel very strongly both ways.[2] I would like to participate

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[1]See Galtung (1969) for a discussion of the relative merits of idiographic and nomothetic approaches.

[2]Lite Beer tastes great *and* is less filling.

in a social science that can generalize and predict without exercising control. For me and hopefully for others, this implies the construction of a social scientific approach grounded in a knowledge interest in emancipation. This "hermeneutical" approach would take into account the interpretive particularities of political events, thus allowing the expression of freedom. These particular, freedom-expressive, interpretive propositions then become part of the repertoire of premises used to induce the general propositions deployed subsequently as the major premises of deductive predictions. Only in this way can we avoid imposing meaning on the human subjects of human science. The approach is emancipatory in that it affords the expression of human freedom absent control, while it constructs general theory to emancipate us from the oppression of nature, including our own, human nature. It is quite consonant, then, with what Alker (1988) calls "emancipatory empiricism."

With the Relatus text analysis system, Mallery and I are developing techniques that serve this knowledge interest. We seek to combine the qualitative, contextual, intentional, and freedom-expressive advantages of the idiographic approach with the reproducibility and generality advantages of the nomothetic approach. By constructing representations of the beliefs that political actors deploy to interpret political situations, and by constructing models of political events within those interpretive environments, we hope to provide an adequate descriptive base for our hermeneutical approach.

One particular proposition will not be put forward. Because some people occasionally hear this proposition, despite the fact that Mallery and I never speak it, I will unambiguously deny it now. We do not propose that scholars drop everything and adopt the techniques we are only now developing. It will become plain in Section 3.2 that this would be woefully premature and thus exceedingly unwise. We have directed our efforts toward a development of a *general* computational environment for a broad range of textual-analytic applications that can contribute to theory development. These efforts have already produced a limited set of currently applicable capabilities, mentioned below. To reach our goal, however, we must enlist others in the implementational effort. I will conclude with some views on how that enlistment process might best be activated.

First, I must directly address Phil Schrodt's questions, since answers to them motivate the need for this enlistment. Although text analysis has broader scope, I will speak almost exclusively with respect to events data. Apart from the fact that this panel concerns events data, I have three reasons.

1. Analyses of political events and transactions could be far more useful than they have been heretofore in the construction of empirical political theory at all levels.

2. While textual data might fruitfully be applied in many areas, event-analytic applications appear to be most readily amenable.

3. Currently available events data sets have been reduced from textual sources, and, as a result, direct comparisons of numerical and textual representations are possible.

2. Words and Numbers

The 2x2 matrix in Table 2-1 compares textual analysis and numerical analysis in terms of two general requirements for conducting analytical research directed toward theory development -- data requirements and technical requirements.

Requirement	Textual Analysis	Numerical Analysis
Techniques	Few techniques. Descriptive.	Many techniques. Analytical.
Data	Data abundance. Data richness.	Data scarcity. Data poverty.

Table 2-1: Assessing Textual and Numerical Analysis

2.1. Technical Requirements

Theory construction requires hypothesis-testing techniques. Without them, we might certainly perhaps induce general theoretical propositions from idiographic case studies. But we could not test hypotheses deduced from these propositions. Theory growth would be halting at best.

The inferential statistical techniques borrowed from the physical sciences serve this purpose well. The availability of these techniques, I am convinced, justifies the determination with which behavioralists adhere to them. They fear that, without them, the ground of social knowledge would consist only of collections of anecdotes and unsystematic conjectures -- not in demonstrable facts.

Traditionalists correctly observe, however, that these techniques can blind us to the essential variety of political events and processes. The qualitative richness of events, the critical aspects of the contexts in which they occur, and the various ways in which the same event might be interpreted are lost, they argue, whenever these empirical phenomena are reduced to a particular researcher's necessarily simplistic quantified categorial scheme.

These strongly held positions appear in various places[3] and on occasion can be heard in the halls of the departments. I believe that the new symbolic modeling techniques that fall under the misnomer "artificial intelligence" afford us the opportunity to create reproducible models and test hypotheses without at the same time imposing *our* understandings on the phenomena these models represent.

In implementing Relatus, Mallery and I aim to produce *general* techniques for developing empirical theory from textual data.[4] Thus far, Relatus meets the descriptive requirements for social scientific applications of AI -- efficiency, fidelity, and generalizability (cf. Duffy and Mallery, 1986).[5] We have thus already arrived at the point at which AI techniques generally stop. The system represents the contents of textual propositions as a network of relations that are suitable for use as presuppositions to be used in interpreting subsequent propositions input to the model. Relatus therefore now provides the descriptive foundations for a polimetric practice that evaluates political phenomena in the terms in which they are understood by political actors themselves (cf. Alker, 1975).[6]

As Bennett (1984) and Chan and Sylvan (1984) have noted, descriptive felicity does not suffice to make AI techniques applicable in social science. Techniques must be devised for testing empirical hypotheses within this descriptive base. AI text analysis techniques would otherwise be close to useless for theory development. Below, I discuss the approach to analytical inference that Mallery and I have discussed over the past several years. But first I want to tell you why we bother.

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[3]For a collection of papers that debate the issue with respect to international politics, see the collection of essays in Knorr and Rosenau (1969), some of which are cited individually in this essay.

[4]The general nature of our work distinguishes it from AI applications that have already appeared in the social sciences (and most of it in international relations: see (Mallery, 1987) for a review of these efforts). We are not *applying* existing AI techniques so much as we are *implementing* a computational environment suitable for testing and thus developing empirical social theories. Given this end, we cannot ignore the problems of interpretation that implementors of AI systems for mechanical control, straightforward informational retrieval, etc., can easily assume away. Our approach is thus both computational and hermeneutical (cf. Winograd and Flores, 1986; Mallery, Hurwitz, and Duffy, 1987).

[5]For discussions of some of the technical issues resolved along the way, see (Duffy and Mallery, 1984; Mallery, 1985; Duffy, 1986).

[6]Unlike the Schank-Abelson conceptual dependency approach that Alker reviews, Relatus refrains from imposing purportedly universal interpretations upon the textual contents under analysis. Interpretations are grounded not in any "semantic primitives". There is substantial evidence that these have no cognitive reality in any event (cf. Mervis and Rosch, 1981: 104-106), and that the lexicalist approach we adopt is required to match human performance in drawing analogies (Gentner and Landers, 1985) and in syntactic processing (Chomsky, 1970).

2.2. Data Requirements

We require more than hypothesis-testing tools in order to develop theory. We also require data. Our data requirement has two aspects.

1. We require an *amount* of data sufficient to address the sorts of hypotheses that can be produced in the course of theory development.

2. We require that these data be *representative* measures of the phenomena under study. The representativeness requirement has two aspects.

   a. The data must be valid with respect to content. They must consist either of the entire population of observables or of a sample drawn randomly from that sample. (Kerlinger, 1964: 457-458).

   b. The data must be valid with respect to construct. They must neither underrepresent nor overrepresent the contents of the theoretical constructs operationalized in our measures (Cook and Campbell, 1979: 64).

These validity concerns are reflected in Table 2-1 as the relative *richness* of numerical and textual data.[7]

2.2.1. Data Availability

Given the abundance of textual data sources for international events, remarkably little has been reduced to numerical matrices suitable for statistical analysis. Textual data sources abound. Newspaper articles, policy statements, cable traffic, and historical narratives might all be sources for generating events data. An infinitesimally small proportion of the information embedded in these sources has been used in the construction of the existing numerical events data sets (e.g., WEIS, CREON, COPDAB, SherFACS). With respect to the identification of events, the addition of sources might have little marginal utility (Hoggard, 1974). However, with respect to the relevant details of particular events and to differences in their interpretations, additional sources may provide great amounts of useful information.

The high costs of converting textual information to numerical information are primarily responsible for this disparity. In order to assess the reliability of event categorizations, multiple coders ought to be employed. In order to ensure the validity of those measures, those multiple coders ought to code texts from multiple sources. Thus, the labor costs for converting textual accounts into numerical events data sets can rapidly consume the monies appropriated for data generation.

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[7] I purposefully gloss other varieties of validation here. With respect to events data, we have no criteria against which to assess our measures, so criterion-related validity is not relevant. The discussion below of the construct validity of events data should suffice to demonstrate the irrelevance of face validation.

2.2.2. Data Richness

Turning from the quantitative superiority of textual data over numerical to examine their qualitative differences, I want to show that textual data more richly or fully represent events, but not in the sense of content validity or sampling representativeness. A staightforward technique exists for assessing the content validity of events data (McGowan, 1974).

The second sort of representativeness is at issue here. This concerns construct validity, or the representativeness of theoretical constructs in the data. Construct validity constitutes a more fundamental problem for numerical events data. I have discussed the problem elsewhere with respect to content analysis as a genus (Duffy, 1987a) of which events data generation is a subordinate species. I contend that *variables constructed by categorizing textual accounts of international events generally underrepresent the event construct because they reflect singular interpretations of events that take plural interpretations.*

To accept this assertion, one must accept the premise that multiple interpretations in fact constitute an essential aspect of international events. This premise in turn boils down to the contention that *perceptions matter* in international relations and foreign policy analysis.[8] Because others, notably Burton (1972: 55-78), Rosenau (1973: 58), and Jervis (1976: 13-31), have already argued the case much more persuasively than I could, I will not argue it here.

I would only dispute parenthetically the notion, which appears with startling frequency, that we may somehow distinquish "true" perceptions from "misperceptions," or that better measures can control for "bias" in interpretations, providing better approximations of the world as it really is. Who determines which perception is the one correct perception? To claim the absolute validity of one's own perception of the world is to claim to have been blessed with a God's-eye view (Putnam, 1981).[9] We each encode a *version* of the world that has not validity but *rightness* in the sense that our ideas cohere with our other ideas (Goodman, 1978). These include our conceptual constructs, our internalized cultural norms, our perceptual fields, our life-experiences, and our mental models of the world versions that others, with whom we wish to sociate, disclose to us in discursive and

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[8]One cannot object that interpretations and perceptions are wholly different matters. For a review of social psychological research that shows the intimate relation between interpretation and perception, see (Bennett, 1981: 87-93).

[9]Rosenau (1973: 58) anticipates Putnam's view on the analyst's false presumption of omniscience. Unlike Rosenau, however, Putnam does not appeal to better approximations.

practical action (Habermas, 1981).[10]

One might be concerned that this view beaches us on the shores of cultural relativism, the shifting sands of which cannot support theory construction. I promise later to show how we might swim toward more solid ground. For now, note only that, on this view, attention to the disparities of world-view across actors assumes vital importance in developing empirical political theory. The perspectives of actors become *essential* aspects of political phenomena. Neglecting perceptions in social analysis risks the production and pseudo-corroboration of self-serving but ultimately self-deceiving theoretical propositions.

The processes of theory construction and operationalization are implicated here. Empirical political theories, as psychological and sometimes textualized structures in which general concepts are connected causally for the purpose of explaining political phenomena, bear a family resemblance to political ideologies. Ideologies differ from theories in that they include a significant practical component. Political ideologies suggest action strategies for the pursuit of practical political goals. For the reflective mind, theoretical beliefs and ideological beliefs must mutually cohere.[11] Theories buttress ideologies by providing explanatory grounds for legitimating particular practical actions. Ideologies, in turn, condition theory formation and theory development. While empirical political theories certainly assume self-organizing characteristics, suggesting self-developmental paths to be conducted as "normal science," ideological considerations provide a large proportion of their original motive force, even if only implicitly.[12]

Perhaps because ideologies and perceptions of fact vary most widely across societies, the correlation of theory and ideology is nowhere more evident than in international relations. Alker and Bierstecker (1984) provide a great service to what they call the "inter-discipline" of international relations. They unmask the strong relationship between the national affiliations of scholars and both the methodological approaches they adopt and substantive results they produce. They reveal further the limitations of knowledge cumulation within the parochial normal-

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[10]This view is neither idealist nor materialist in the philosophical senses of those terms. Putnam calls it "internalism."

> . . . [T]he mind does not simply "copy" a world which admits of description by One True Theory. But my view is not a view in which the mind *makes* up the world either. . . . If one must use metaphorical language, then let the metaphor be this: the mind and the world jointly make up the mind and the world.

[11]I recognize the fact that many individual minds can maintain mutually incompatible ideological and theoretical propositions.

[12]Putnam (1981: 127-149, 201-216) discloses the ungroundedness of the fact/value distinction, explaining at the same time why it is held so strongly.

scientific bounds of the traditional-idiographic, the behavioral-nomothetic, and the dialectical hermeneutic research traditions. They demonstrate convincingly that the greatest theoretical advances cumulate not *within* those traditions, but within the ongoing dialogues *between* them.

When one categorizes textual sources, generating events data, one does not operationalize value-free or unbiased concepts. To claim value freedom or unbiasedness, one attempts to identify the God's-eye view for one's own.[13] Since the concepts are value-*laden*, embued with a particular world-view, so too are the generated data. This presents little difficulty *within* a particular research program[14] and for those interested in advancing practical political goals, but it presents great difficulties for the "inter-discipline" of international relations. The instant we recognize that plural theoretical formulations across research traditions reflect and are reflected by the plurality of perceptions received by foreign policy decision makers when interpreting the meaning or significance of events, we also recognize that any singular operationalization *necessarily* underrepresents the event construct. Existing events data sets, for this reason, lack construct validity.

The construct validity problem is certainly more salient for some variables than for others. Variables that simply identify the actors involved, for example, might generate little disagreement. Variables that purport to assess the *severity* of events, however, could generate heated disagreement, depending upon who was making the assessments. In the Stanford project, Moses et al. (1967) wanted to construct a severity measure for events drawn from World War I. They asked four graduate students to Q-sort the events. One sort that did not correlate highly with the others was tossed out, ostensibly because that graduate student had been insufficiently trained. Moses et al. did not report, however, that this student happened to be an Egyptian woman while the others were white American males.[15]

This anecdote illustrates a general point that can be corroborated by examination of the many alternative and incommensurable accounts of world history. Different peoples (and different individuals) bring different experiences to bear on their interpretations of political events. To the extent that events data generation projects operationalize one particular life-world -- most often the life-world of twentieth-century privileged American white males -- they tend to produce highly delimited sets of substantive results that serve a highly delimited set of practical

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[13]Parsons' malinterpretation of Weber's essay on objectivity in the social sciences attempts to justify this scientistic move, but Habermas' critique of Parsons reveals the *hubris*. The essays by Weber, Parsons, and Habermas are collected in (Dallmayr and McCarthy, 1977).

[14]Secondary users of events data can find existing data sets inappropriate for their uses to the extent that their theoretical interests diverge from those of the generator of the data set. See (Burgess and Lawton, 1975).

[15]Personal communication with the Q-sorter herself.

political interests. As Alker (1988) cogently puts it, "[d]ata coding procedures . . . often (sometimes unconsciously) reflect just those social and political forces affecting war and peace that are supposed to be the objects of investigation."

These limitations of events data generation are by no means limitations *in principle*. One might generate multiple event categorizations, each one consistent with a particular relevant life-world. The costs of data generation, which are already enormous, would have to be multiplied further by the number of interpretations believed to be relevant to any particular set of events.

3. Stepping Back and Stepping Forward

If theory is to advance, we need data that reflect faithfully the multiplicity of interpretations policy makers impose upon the world and its events. In order to develop theory concerning international events and transactions, the most propitious course of action would involve stepping back in order to step farther forward. We ought to step back to reconsider (a) our relationship to the phenomena that we model and (b) our interest in constructing and analyzing these models. We ought then to step forward, constructing theories that enlighten in order to emancipate, not to oppress.

3.1. Two Steps Back

3.1.1. Stepping Back to the Primary Data

Earlier I argued that alternative perceptions or interpretations constitute an essential aspect of international events. Recognition of this fact need not send us hurtling headlong down the slippery slope of cultural relativism. We prevent such an eventuality only by reframing the scope of our inquiry.

To its credit, much of the scholarly international relations community already recognizes the need for this reframing. It is no longer controversial to contend that we ought not treat nation-states as if they were billiard balls or some simplistic stimulus-response mechanism. State actions remain inexplicable and uncomprehensible without some reference to the substate factors that contribute to policy decisions. At the very least, reference to the major system components at the next lower level of analysis seems required. These include bureaucratic operating procedures, domestic as well as foreign political and economic considerations, and the like. It also appears acceptable to contend that we ought to focus analytical attention upon the psychological state of the decision maker at the time of the action decision.

The cognitive movement in social science is post-behavioral in the sense that it draws from the fruits of the behavioral revolution, but passes beyond its

limitations.[16] Any decision by any actor is a function of the beliefs and desires of that actor. With respect to guiding state policy, beliefs about bureaucratic operations, domestic political and economic concerns, the goals of other states, structural economic conditions, etc., all enter into policymakers' cognitive calculi. The minds of policymakers are the loci at which these factors conjoin to determine state actions. These factors become admixed there with a variety of cultural, historical, and biographical factors -- the life-history of the policymaker -- that serve as interpretive presuppositions used to make sense of the stream of events.

Variations in cross-national perceptions of international events follow inexorably from variations in the cognitive contents that perceivers construct. To avoid the trap of relativism and to retain any hope of constructing general theory with respect to international events, we ought to focus our attention not on *our* perceptions of international events as reflected in our coding operations, but on *their* perceptions of international events. This in turn requires the construction and analysis (including comparative analysis) of models that reflect the salient alternative understandings of international events.

This is the first step back. By analyzing the understandings of events salient with respect to the event itself, we analyze the phenomena of interest. Analyses of our interpretation of those events can only produce theory about our interpretations, not theory about the events. The understandings we ought to study are reflected in the primary data -- in the broad variety of texts that each express particular interpretations of events.

3.1.2. Stepping Back to our Interest in Theory

The second step back concerns the critical self-understanding of the social scientist. *Why* do we want to construct theory? This is a question each researcher ought to ask of himself or herself, and one that students ought to be encouraged to confront.

My personal answer to this question, as should by now be abundantly clear, rejects the scientistic interest in control in favor of the more humane interest in emancipation. I believe that most of us would opt similarly once we confront ourselves with the question. Anyone who truly adopts this knowledge interest cannot impose his or her categories of understanding upon any political phenomenon for which multiple, competing understandings constitute an essential component.

The emancipatory interest implies much more than this, however. It rejects the pretense of scholarly disinterestedness, behind which the interest in control often cowers. Instead it orients social scientific activity toward the attainment of a

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[16] Jönsson (1982) reviews cognitive approaches in international relations, providing at the same time a useful account of the motivations behind these efforts.

practical, political goal -- the attainment of shared, and not imposed, understandings that can provide the foundation for responsible collective action -- a collective action that emancipates by releasing us from oppression and war.

To provide an example of how we might deploy this knowledge interest and these techniques to emancipate, one need look no further than the Cuban missile crisis -- a crisis that arguably brought us closest to the brink of global self-annihilation. George and Smoke (1974: 447-493) show how American interpretations of Soviet intentions and attitudes toward risk and Soviet interpretations of American resolve contributed to the onset of the 1962 Cuban missile crisis. They argue further that unsystematic policy analyses in both governments[17] were an outcome of factional and bureaucratic politics in each, allowing these interpretations and attributions of intention.[18] and not others that might have been more appropriate and less tension-inducing, to come to the fore. If rationally deployed, tools for the systematic evaluation of alternative hypotheses about the beliefs, intentions, attitudes, etc. of foreign policymakers could lessen human interpretive fallibility as a source of international crises. It would provide a computational foundation for the evaluation of what Alker, Bennett, and Mefford (1980) have called "generalized precedent logics for resolving insecurity dilemmas."

3.2. Three Steps Forward

3.2.1. Step One: Developing Tools for Textual Analysis

Once we take these steps back, we can step forward toward the provision of usable theory. The first step forward would develop methods of textual analysis capable of folding together the multiple perspectives that constitute events and that provide *meaning* to state interactions. No single categorization scheme can hope to capture more than a single interpretation. For this reason, we ought to step closer to the event phenomenon itself. Instead of imposing our world version on textual events data sources, we ought to analyze alternative narrative accounts of events and transactions.

The beliefs, motives, norms, and even the theories of decision makers, can be reconstructed from textual accounts. So too can the beliefs, motives, norms, etc. that a decision maker attributes to others. The textual data Mallery and I have used while developing Relatus, in fact, are the reconstructed beliefs of the Defense Advanced Research Projects Administration about Soviet military interventions in

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[17]Because more data were available on American policy analysis, this conclusion is less conjectural with respect to that government.

[18]For accounts of how attributions of intention can exacerbate tensions, see Rosenberg and Wolfsfeld (1977) on the Arab-Israeli conflict and Hart (1978) on deterrence theory.

client states.[19]

This sort of analysis is grounded more in logical and linguistic theory than in probability theory.[20] We construct models of the beliefs of political actors from evidence present in textual propositions. These propositions can then be subjected to experimental manipulation to determine whether and to what extent particular propositions affect inferences and subsequent decisions.

An important feature of textual data is their compositionality. This means that textual propositions can readily be integrated into a model constructed from other texts.[21] General propositions drawn from a theoretical treatise, for example, can readily be integrated into a model of particular propositions drawn from an historical narrative.

The compositionality of texts can make analyses more context-sensitive and historically grounded. The social-theoretical contexts (e.g., any of the various theories of political economy) in which choices are made can be included into these models. Likewise, the historical embeddedness of nations and the biographical embeddedness of individuals, because they can be expressed in texts, can be incorporated. When texts are modeled, *absolutely anything expressible textually becomes data amenable to analysis.*

Analysis of multiple textual sources reflecting particular perceptions of events would alleviate, if not remedy, the construct validity problem, but it is no panacea. Other symptoms would still afflict analyses, sapping results of their strength. Any particular textual account, even when produced by the policymaker himself or herself, may camouflage as much or more about the interpretations and perceptions of the actor as it discloses, particularly with respect to motives. Of course, one must proceed cautiously when selecting accounts to analyze, and predictive accuracy will serve as the ultimate measure of the success of such analyses.[22] Text selection nevertheless remains the subjective choice of the analyst.

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[19]Mallery will analyze these models in his doctoral dissertation.

[20]Elsewhere (Duffy and Mallery, 1988), Mallery and I locate our work relative to the traditions of content analysis, information-processing models of planning and problem-solving, cognitive modeling, cognitive mapping, systems analysis, and precedent-based models of decision making.

[21]It should be noted that the ease of textual integration increases as textual processing models are augmented and integrated into the system.

[22]Predictive validity, although unfortunately impossible to assess prior to analysis, is the only form of validity available to the content analyst when the subjects under study are not themselves directly accessible. For a useful discussion of the problem as it pertained to early quantitative content analysis, see (Janis, 1949).

Since the analyst would construct *reproducible* models from these texts, one may test the effects of particular propositional selections in a straightforward manner. One could simply analyze the model with and without any passage that had been or could be challenged as unreflective of the actual beliefs, norms, or intentions of the perceiver under study. Disputes concerning text selection then become disputes over reproducible models. Differences in the inferential consequences of each model indicate whether the dispute makes any substantive difference, and the relative ability of the models to predict actual outcomes serves as the standard for selecting one as more appropriate. Thus, while text selection introduces a certain degree of subjectivity, comparisons of alternative text models introduce a means for intersubjective critiques of alternative selections.

With Relatus, we have attained a reasonable level of descriptive adequacy. We can map a wide, though not unlimited, range of syntactic and semantic relationships into semantic networks.[23] The system has certain deductive and analogical reasoning capabilities, and these are employed in the early analytic applications that are now beginning to appear. For example,

1. Roger Hurwitz leads an effort to detect changes in the phase structure of intentionally-sensitive sequential prisoner's dilemma protocols (Hurwitz, et al., 1986; Hurwitz, 1988).

2. John Mallery has demonstrated analytical operations that inventory the speech acts and attributions of speech acts that appear in texts.

3. Hayward Alker has begun work to model the argument structure of Thucydides' Melian Dialogue in Relatus.

4. Erik Devereux and I have begun work to model the argument structure of portions of the Lincoln-Douglas debates in Relatus.

Many other applications are now possible. However, to be really useful as a tool for theory construction, much more work is needed in implementing tools that can support sophisticated tests of hypotheses. The *basic* machinery for hypothesis testing is in place. Mallery has implemented much of the analogical and deductive reasoning capabilities that are necessary. To make the system more useful, however, we must integrate a developing lexicon that will facilitate inferences about paraphrasal and other lexical relations (Duffy, 1987b). We must also integrate components for representing and reasoning about time (Duffy, 1987c; 1988).

Other facilities and components are needed as well. I will not list them

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[23]Semantic networks are computer graphs that represent relationships. Although they have wider application, semantic networks are used primarily to represent semantic relationships. Discussions of semantic networks appear in most elementary AI texts. For a seminal article exploring their use to model textual data, see Quillian (1968).

exhaustively here. I only wish to stress that a great deal of implementational work remains before us, and that overnight miracles should not be expected. As each improvement is installed, however, the range of applications broadens and the system's analytical usefulness increases correspondingly.

3.3. An Interim Data Generation Application

One feasible interim application might be the development of an events data coding assistant. Consider this scenario:

1. Textual sources for events data are converted to proposition form suitable for mechanical text analysis. This process involves normalizing some unusual sentence constructs, filling ellipses, and specifying intersentential anaphora relations (e.g., pronoun and antecedent relations). As a by-product, this effort would suggest strategies for improving the text-processing model.

2. These propositions are then parsed and the derivations are mapped (or referenced) into semantic network representations.

3. Coding rules consistent with the theoretical interests of the researcher are then specified as constraints in Mallery's reference language.

4. These constraints are then applied to the semantic network to produce numerical matrices suitable for statistical analyses.

The reliability of the output data would be perfect, since they were generated by deterministic applications of the coding rules. Subsequent reapplications of those rules over the same texts would yield an identical data matrix. The validity of the data, of course, remains quite another matter. They will be internally valid to the extent that the specified coding rules reflect the theoretical constructs the researcher has in mind. Their external validity, however, would remain subject to the limitations inherent in existing events data sets, as described above.

Reduction in the costs of events data generation would constitute an important benefit of this interim application. Costs would be reduced further as the text-processing model increased in sophistication as a result of concurrent attention to implementational improvements. To the extent that one can compare alternative codings of alternative accounts, however, one will have taken the first steps toward "a rigorous . . . yet dialogical examination of complementary and contradictory scholarly practices, a necessary step toward a socially achieved (rather than simply posited) scholarly universality" (Alker, 1988).

3.4. The Payoff in Theory and Practice: Two Additional Forward Steps

The development of textual analysis techniques and their deployment in studies that thematize the problem of alternative interpretations of political events can provide advances in the theory and practice of politics generally and international politics specifically. I will discuss each in turn.

3.4.1. The Advance in Theory

I have touched briefly on the theoretical advance earlier, but allow me to underscore its importance by reiterating it here. Textual analyses of alternative interpretations can help us construct theory that is grounded in the knowledge interest in emancipation. The sort of theory that will emerge will less likely reify the political interests of the political units that provide social scientists with the interpretive lenses through which they "objectively" observe reality.

Because the models used to construct this theory represent the cognitive milieu of decision makers, the theory that emerges will be cognitively oriented. But this cognitive orientation need not be limited to the sterile, "cold" cognition of instrumental rationality. By incorporating normative propositions into our textual models, one can analyze the claims to rightness (Habermas, 1973) that ground our emotional lives (Harré, 1984: 136-137). Thus, the theory will include a substantial affective, "hot" cognition component.

The inclusion of normative propositions into our models and analyses implies further that theoretical results will reflect the moral and practical frameworks within which knowledge is actually codified and action is generated. The theory that emerges will thus be recognized by policy makers as consistent with their own, personal understandings of political events.

Further, deployment of such techniques can renew theoretical activity surrounding the role of communication in the life-cycle of political institutions.

3.4.2. The Advance in Practice

Advances in empirical political theory can lead to advances in actual political practice. Textual analyses recast political events as cognitive events. Accordingly, they recast dissensual political conflicts as communicative incommensurabilities. By constructing and analyzing computational models of the interpretations conflicting decision makers construct cognitively, we and they may be able to grasp more fully the consequences of these incommensurabilities and take practical steps to resolve them in order to avoid hostile actions.

Conversely, better understandings of interpretive understandings across political leaderships presents the possibility of constructing institutions within which disputes and conflicts can be rationally settled. The ability to communicate -- the recognition that one shares complementary communicative habits with others that enhances the likelihood that one will be understood -- provides the necessary foundation for the self-identification of a people and the construction of national institutions (Deutsch, 1953: 93-100). Further, these institutions provide fora within

which social arrangements and distributive outcomes are legitimized, constituting the necessary foundation for peaceful coexistence and rational collective action (Douglas, 1986). A social science conceived as theoretical activity directed toward facilitating the construction of such institutions internationally would be one that would be *useful* in achieving the knowledge interest in emancipation -- particularly emancipation from war but also from international domination.

I recognize that these last remarks can be read with some disdain by those of us -- sometimes myself -- who have acquired the cynicism that excessive social knowledge can produce. Nevertheless, I believe that occasionally one ought to flirt with naiveté if only to avoid reproducing the social ills that leads to cynicism in the first place.

4. Conclusions: Recommended Further Steps

4.1. Archive Textual Accounts

Several of the scholars, archivists, and analysts who contributed to discussion drafts compiled for distribution preliminary to an APSA panel last year (Alker, 1987) suggested that we archive textual accounts of national and international events. I concur. As some of the contributors observed, modern optical storage devices make massive on-line text storage feasible. Optical devices can today store data at costs orders of magnitude lower than can traditional magnetic tape media, and with a far greater shelf-life.

Access to these archives would benefit computational text analysts greatly, but not exclusively. Traditionally oriented scholars could make ready use of them. Additionally, statistically inclined scholars would also benefit. Researchers interested in testing novel hypotheses about international events would no longer be limited by operationalizations of primary data users. They would have immediate access to the textual sources from which the primary data sets were generated, and they could generate new data more consonant with *their* theoretical interests. The interim Relatus application suggested above could substantially ease this process.

Textual archiving would also resolve the difficult problem of merging events data. In his comparative study of the coding schemes of four events data sets, Leng (1975) found that, although they were compatible with respect to the identification of events, they were strikingly incompatible with respect to descriptions of the activities manifest in those events. This makes merging these data quite difficult if not impossible. Leng concluded that the best that could be done would be to merge identifications of events and *their verbal descriptions* across data sets.

Based on my remarks above on the compositionality of textual accounts, I concur with this suggestion. Merging textual accounts, even when they represent different perceptions of events, is far more straightforward than merging data matrices that reflect operationalizations of different theoretical constructs. The maintenance of textual archives, then, would promote greater data flexibility, affording research efforts greater ability to benefit from the archives.

4.2. Promote Research in Computational Text Analysis

While some benefits of textual archives can be realized immediately, rewards will increase as progress is made in the basic research and the implementational applications. I do not pitch here for Relatus specifically, but for computational linguistics as a whole. A great deal of work is required -- far more than can be incorporated into one project. Ongoing computationally based research in lexicography, pragmatics and discourse pragmatics, lexical semantics, syntactics (especially parser development for a wider variety of languages), morphology, and other areas must continue if the necessary underlying base for textual political analysis is to be nurtured and grown.

The highly limited funds available for social scientific research should *not* be expended for research in computational linguistics. While we may wish to invest in exemplary *political* applications of this research, funding for the computational substrate should continue from other quarters. Unfortunately, computational linguistics appears to be undergoing a major defunding cycle at the moment -- and for good reason. From information I have been able to glean, funding authorities find the following faults with computational linguistics:

1. There are no visible practical applications. As user interfaces, command processors and menu interfaces appear to be more practicable.

2. The computational linguistics community provides few standards to judge the comparative merits of research.

3. Research proposals in computational linguistics fail to specify clear timetables and milestones indicative of progress.

I believe that 2 and 3 follow from 1. There are no timetables and no standards because computational linguists have no *practical* goals. They have sought almost exclusively to advance linguistic theory for itself. While there is nothing inherently deficient in that goal, the traditional public funders of this research cannot justify continued support for strictly theoretical development in an era of public fiscal austerity. They need to see some payoff.

This creates an unusual opportunity for those of us who see the advances that textual analysis capabilities can have for international relations in particular and for political science in general. *We can provide the applications.* Moreover, the applications we envision can provide the merit criteria funders require.

1. **Efficiency**: Large textual corpora should be processed efficiently. Due to the complexity of social and political affairs, relatively large bodies of text must be modeled. As the size of textual models increases, processing should not be slowed concomitantly.

2. **Generalizability**: Processing models should be general across a wide

range of human experience. Textual models should be constructed in ways that reflect the consequences of variations in interpretive presuppositions across interpreters.

3. **Fidelity:** Textual models should faithfully represent the beliefs, meanings, and intentions that appear in the texts themselves. Interpretations should be based solely on evidence present in texts already included in the model, and not on any "hard-wired" presuppositions of the system implementor.

4. **Analyticity:** The deductive consequences of retracted or modified beliefs should be testable in models of thinking subjects constructed from textual sources, thereby providing a capacity for hypothesis testing.

The analyticity criterion is stated above as a minimal criterion to support social scientific theory development. Optimally, the full range of deductive, inductive, and abductive logical operations necessary to support learning (theory development) should ultimately appear.

The academic and computational infrastructure necessary to provide these tools is already in place. I believe that we need these tools in order to build a body of social scientific theory with which we can make sense of political affairs, particularly since political affairs most often appear first to the analyst in the form of textual reports. If we want these tools, now is the time to press for their production.

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